



REMARKS

The remainder of this Reply is set forth under appropriate subheadings for the convenience of the Examiner.

Allowable Subject Matter

Claims 14, 16 and 17 are allowed.

Rejection of Claims 1-9, 12-23 and 29-42 under 35 U.S.C. § 103(a)

Claims 1-7, 12, 13, 15, 19-23 and 29-33 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,337,068 ("Stewart") in view of U.S. Patent No. 5,300,976 ("Lim") and U.S. Patent No. 6,133,979 ("Komatsu"). Claims 8-9, 18 and 34-42 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Stewart in view of Lim and Komatsu, and further in view of U.S. Patent No. 5,627,560 ("Verhulst"). Although the Office Action dated September 7, 2005 stated that Claims 8-11, 18, 24-28 and 34-42 are rejected in view of Stewart, Lim and Komatsu, and further in view of Verhulst, it is noted that Claims 10-11 and 24-28 were canceled in the Amendment filed on August 18, 2005.

Applicants' claimed methods of independent Claims 1, 12, 34 and 35 each employ a matrix liquid crystal display (LCD) having an array of at least 75,000 pixel electrodes and an active area of less than 20 mm². As previously presented, the methods of independent Claims 1, 12, 34 and 35 each also include heating the liquid crystal of the matrix LCD.

Stewart discloses a field sequential color display system employing a single matrix of liquid crystal devices over a large number of red, green and blue florescent lamps. However, as admitted by the Examiner, the primary reference, Stewart, does not teach a matrix liquid crystal display having an array of at least 75,000 pixel electrodes and an active area of less than 20 mm². Also, as admitted by the Examiner, the primary reference, Stewart, does not teach heating the liquid crystal in a repeat cycle. The Examiner nonetheless contends that "it would have been obvious to one of ordinary skill in the art to have modified Stewart's LCD into a very small display (e.g., view finder) as taught by Lim because the active matrix LCD is controlled by a TFT switch which is build on a substrate and the pixel can be made in a very small size." The Examiner further stated that "it would have been obvious to one of ordinary skill in the art to

have modified Stewart and Lim with the features of the heating liquid crystal display as taught by Komatsu so as to maintain a proper temperatures range for the liquid crystal display." Applicants respectfully disagree with the Examiner for the reasons set forth below.

First, there is no motivation to combine the teachings of Stewart and Lim, because the display systems of Stewart are limited to those having an active display area relatively much larger than 20 mm², for example, about **62,000 mm²** (i.e., 8 x 12 inches):

..., 24 lamps are used to illuminate an **8 by 12 inch** display. (Col. 8, lines 50-51, emphasis added)

Evidence for this assertion can be found in Stewart itself. For example, Stewart specifically teaches the use of a large number of red, green and blue lamps, as stated on Col. 8, lines 54-59:

Having a large number of lamps enables one to operate the system in a continuous scrolling mode where the number of activated lamps remains approximately constant and progressively scans ...

Also, Stewart teaches that on Col. 8, lines 43-44:

Each of the lamp tubes is approximately **seven millimeters** (mm) in diameter. (emphasis added)

With such large lamps sized about 7 mm in diameter (i.e., about **38 mm²**) in a number of, for example, **9** (FIG. 2a) or **24** (Col. 8, lines 50-51), the LCD display of Stewart is consequently large.

Further, although the Examiner asserted that "the active matrix LCD is controlled by a TFT switch which is build on a substrate and the pixel can be made in a very small size," Stewart **teaches away** from doing so, because the LCD display systems of Stewart are designed with **larger design rules**, having relatively small numbers of pixel elements with relatively large area. For example, as stated on Col. 8, lines 4-5, "each of the pixels of the [Stewart's] field sequential device is greater than in the area multiplexed device." Further, Stewart discusses the disadvantages associated with small-sized pixel elements (Col. 4, lines 9-20):

A further *disadvantage* of area multiplexed screens is the appearance ... *due to the smaller size of the sub-pixels* as compared to monochrome pixels. ... Since the sub-pixel elements are *relatively small*, charge from one sub-pixel may affect the liquid crystal material beneath an adjacent sub-pixel. This may *affect the purity of the displayed color*. (emphasis added)

Also, as stated on Col. 12, lines 35-43, Stewart teaches away from employing a large number of pixel elements:

A full-color area multiplexed LCD has three times the number of pixels of a field sequential LCD. Since the difficulty of manufacturing increases with the number of elements, this *greater number of pixel elements is a disadvantage*. Because the field sequential TFT plate is made *with larger design rules* and incorporates only one third number of active devices, such a system can be fabricated with substantially higher yield than an area-multiplexed system. (emphasis added)

As such, the teachings of Stewart are limited to LCD display systems designed with *larger design rules*, *i.e.*, having relatively small numbers of pixel elements with relatively large area, and having a large number of red, green and blue lamps sized about 7 mm in diameter. Therefore, the skilled artisan would not be motivated to modify the Stewart's LCD display systems to come up with a matrix LCD as employed in Applicants' claimed methods, because Stewart fails to show any advantage to doing so.

Second, even if Stewart and Lim were to be combined, *arguendo*, Lim does not remedy the deficiencies of Stewart in that Lim does not teach how the LCD display systems of Stewart can be reduced to the size needed in Lim. In particular, nowhere does Lim teach that its LCD device **5a** employs a matrix LCD having an array of at least 75,000 pixel electrodes and an active area of less than 20 mm². Further, there is no teaching in Lim of a color light source, not to mention how to incorporate into its LCD device **5a** a bank of red, blue and green lamps necessary for such a field sequential LCD device as Stewart's.

Komatsu discusses an LCD device including a temperature controlling member that controls the temperature of the liquid crystal panel. Verhurlst discusses a display control circuit for switching an applied voltage to the counter electrode panel to erase an image presented on the display.

However, as with Lim, neither Komatsu nor Verhurlst remedy the deficiencies of Stewart in that none of the references teaches how the LCD display systems of Stewart can be reduced to the size recited in Applicants' claims.

For the above reasons, none of the cited references, Stewart, Lim, Komatsu and Verhurlst, either in combination or separately, renders the subject matter of independent Claims 1, 12, 34 and 35 obvious. Accordingly the presently claimed invention is not obvious over the cited art of record. Therefore, Applicants respectfully request that the rejection of Claims 1-9, 12-23 and 29-42 be reconsidered and withdrawn.

Information Disclosure Statement

A Supplemental Information Disclosure Statement (SIDS) is being filed concurrently herewith. Entry of this SIDS is respectfully requested.

SUMMARY AND CONCLUSIONS

Claims 14, 16 and 17 are allowed. As discussed above, the remaining pending Claims 1-9, 12-23 and 29-42 are non-obvious in view of the cited art of record. Therefore, it is believed that all pending claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

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